

COMMUNICATION DEVICE, IMAGE-PICKUP DEVICE, STORAGE
MEDIUM AND COMMUNICATION METHOD

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to the art used in a device or system having an image-pickup function and communicative function, and in particular to the art using the communicative function for radio transmission
10 of an image information item obtained by the image pick-up function.

Related Background Art

So far, when radio-transmitting the picture image obtained by the image-pickup function of a digital
15 camera or the like to a device such as remote place server through communication device such as portable phone or PHS (Personal Handyphone System), the following method is generally used.

As shown in Fig. 12, for example, connection
20 between a digital camera 501 and a note model personal computer (hereinafter, referred to as "Note PC") 502 has been made using a cable 504 (or a PC card) and connection between a Note PC 502 and a potable phone 503 is also made by using a cable 504. Then, the
25 pickup image obtained by using the digital camera 501 is transferred to the portable phone 503 after once transferred to the Note PC 502. Thus, as shown in Fig.

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13, the pickup image transferred to the portable phone 503 is radio-transmitted via a general public network 506 to a server 507 located at a remote place.

However, such a method was advantageous in that a former device could be utilized as it was, but with disadvantageous problems that the construction became so complicated as to damage the portability or manipulativity.

Then, to solve these problems, a composite device (or multifunctional device) 510 having the image-pickup function of a digital camera or the like and the communicative function of a portable phone, a PHS or the like, for example, as shown in Fig. 14, has been proposed.

As shown in Fig. 14, the composite device comprises a lens 511 for focusing a subject ray to a image pickup such as CCD, a shutter button (shutter switch) 512, a switch group 513 made of a plurality of manipulating switches, a color LC (Liquid Crystal) 514 for displaying the pickup image obtained by the above image pickup element and a communicative antenna 515.

With such a composite device 510, a process from the photographing of a subject to the radio transmission of the pickup image thereby obtained to a server is executed, for example, according to the flow charts of Figs. 15 and 16.

First of all (See Fig. 15), a user set up a

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Thereby, in the composite device 510, read of the

5 By manipulating a given manipulating switch in the
switch group 513, a user selects an image to be
transmitted from the pickup image data screen-displayed
on the color LC 514 (step S534). Selecting an image at
this time relates to a single image, two images or
0 more, or all images stored in the store memory.

In the composite device 510, a processing for confirming the image to be transmitted and the transmission destination to a user is performed when the user manipulation at the steps S534 and S535 is recognized at the composite device 510 (step S536). As a result, if an instruction of "OK" is made from a user by means of the switch group 513 or the like, the image transmission processing from the next step is actually executed.

5 Namely, first, according to a procedure depending
on the type of a composite device 510 (if the
communicative function pertaining to the device is PHS,
for example, a transmission control procedure like
"PIAFS: PHS Internet Access Forum Standard"), a call
0 generation to the public network is made (step S537).
Thereby, to the composite device 510, the OK or NG of
call reception is sent back from the call destination
server.

20 When the negotiation between the composite device
510 and the server is completed and the communication
according to a protocol such as TCP/IP (Transmission
Control Protocol/Internet Protocol) becomes possible,
processing for transmitting the image selected at the
25 step S534 to the server is executed in the composite
device 510 (step S540). The error processing during a
communication, retransmit processing or the like at

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With a former composite device 510, however, a user needed at least three times switching manipulations of the step S531 (mode changing manipulation), the step S534 (selecting manipulation of

a transmit image) and the step S535 (selecting manipulation of a transmission destination) to transmit the pickup image obtained in the photographing mode to the server as shown in Fig. 16.

5 This provides no problem when no instantaneous response is so much required such as the case of transmitting the accumulated photograph images collectively afterward, but becomes very troublesome, for example, in a case where it is desired to transmit
10 only one image of the subject before eyes to a server or like cases.

 Besides, also in a case where it is desired to transmit successive photographed images to a server during the continuous photographing but not a single
15 image only, the photographing must be interrupted once for the transmission and there occurs a possibility of missing a shutter chance during this interruption.

SUMMARY OF THE INVENTION

20 It is one object of the present invention to solve all or at least one of the problems mentioned above.

 Besides, it is another object of the present invention to reduce the troublesomeness in transmitting image data.

25 Furthermore, it is still other object of the present invention to transmit an image without any damage to the instantaneous response of image pickup

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means.

Under these objects, a communication device connected to a image pickup device for photographing a subject comprising intake means for taking in an image from the above image pickup device, communicative means for transmitting the pickup image taken in by the intake means to a transmission destination in communication therewith and control means for starting the operation of the communicative means in response to the image pickup operation is disclosed according to one preferred embodiment of the present invention.

Still further, it is an object of the present invention to provide a communication device available anywhere.

Under this object, it is disclosed according to another preferred embodiment of the present invention that the above communicative means radio-transmits.

Still further, it is another object of the present invention to enhance the availability and economics of communicative means.

Under this object, it is disclosed according to another preferred embodiment of the present invention that the above control means controls the above communicative means so as to make an interruption of communication with a communication destination after the lapse of a given time after the completion of the transmission of the above pickup image.

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Furthermore, it is yet another object of the present invention to make the communication device appropriately cope with the communication state of another communicative means.

5 Under this object, it is disclosed according to yet another preferred embodiment of the present invention that the store means for storing the pickup image obtained from the above image pickup means is further provided, the above communicative means
10 includes detective means for detecting the state of communication with the above transmission destination and the above control means stores the above pickup image once into the above store means on the basis of the detected result by the above detective means.

15 Furthermore, it is disclosed that, in case of being incommunicable based on the detected result by the above detective means, the above control means once stores the above pickup image into the above store means and the pickup image stored in the above store
20 means is transmitted by the above communicative means in case of becoming communicable.

Furthermore, it is disclosed that the above control means makes a control so as to perform an operation of the above detective means and the above
25 operation based on the detected result in the above detective means in parallel with the ordinary operation.

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Besides, it is yet another object of the present invention to provide an image pickup device or a communication method having a novel function or alternatively a storage medium for realizing the function of such a device or method by using a computer.

The other objects and characteristics of the present invention would be apparent from the description of the following embodiments and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 which is composed of Figs. 1A and 1B is a block diagram showing the configuration of a composite device according to the present invention with the first embodiment;

Fig. 2 is a flow chart for explaining the processing extending to the transmission of a pickup image in the above composite device;

Fig. 3 is an illustration of a screen for selecting a transmission destination server in the above composite device;

Fig. 4 is a flow chart for explaining the processing extending to the transmission of a pickup image in the above composite device with the second embodiment;

Fig. 5 is a flow chart for explaining the detail of an interval step processing in the above processing;

Fig. 7 is an illustration of the memory map of a
buffer memory in the composite device for storing the
pickup image once in case of being incapable of pickup
5 pickup image transmission in the third embodiment;

Fig. 9 is a flow chart for explaining the
10 processing of setup to the above Transmission WAIT
flag;

15 Fig. 11 is a flow chart for explaining the
processing for the automatic transmission in case of
becoming capable of communicating the pickup image
stored once in the above buffer memory;

Fig. 13 is an illustration of the situation of a pickup image being transmitted to a server by means of the above communication device;

25 Fig. 14 is an outside view of a composite device
of the above pickup device and the above communication
device;

Fig. 15 is a flow chart for explaining the conventional processing from depressing a shutter switch to obtaining a pickup image in the above composite device; and

5 Fig. 16 is a flow chart for explaining the processing extending from obtaining a pickup image to transmitting it in the above composite device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

10 Hereinafter, the embodiments of the invention will be described referring to the drawings.

(First Embodiment)

15 The present invention is applied to a composite device (or multifunctional device) 100 of a pickup device and a communication device, for example, as shown in Fig. 1 (composed of Figs. 1A and 1B).

20 This composite device 100 is similar in external appearance to the former composite device 510 shown in Fig. 14, but differs in a configuration as to change into a certain mode absent in the former composite device 510 by making a given switching manipulation. In this mode, depressing a shutter switch 512 leads to the execution of a photographing operation in the composite device 100 and at the same time the automatic
25 connection of the composite device 100 itself to a public network in such a manner as to transmit a pickup image to a remote place server. Here, the relevant

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shutter switch 512, a power source unit 133 for turning ON/OFF the power source of the composite device 100, an external input/output unit 134 for inputting/outputting an image information item from/to the outside by the NTSC scheme or the like and a controller (control microcomputer) 131 for controlling these.

The LCD unit 140 comprises a color liquid crystal (LCD monitor) 141 (corresponding to the color liquid crystal 514 in Fig. 14), a backlight/inverter 142 of the LCD monitor 141 and a controller (LCD controller) 143 for controlling these.

The communication control unit 150 is so configured as not only to establish the connection to the partner side by call generation/call reception operation determined corresponding to the type of a composite device 100 to a public network but also to deliver image data to a network according to a protocol such as TCP/IP or convert the request from the partner side into a control signal in the composite device 100 for notification.

For this purpose, the communication control unit 150 comprises a communication controller 151 for controlling the communicating operation, a communication buffer memory 152 connected to the communication controller 151, and a serial port 153, an IrDA port 154 and an RF modulator 155 respectively connected to the communication buffer memory 152, and a

radio wave circumstances or the distance from the neighboring base station, the condition of the composite device 100 itself (standing still or moving) or the like, but here, these changing factors are
5 assumed to be absent for simplicity. Besides, it is assumed that, after the connection to the transmission destination server (hereinafter, abbreviated to destination server) is established, no interruption during the communication occurs.

10 First, a user sets the composite device 100 to the direct transmission mode by a given manipulating switch in the switch group 132. Correspondingly, a display indicating the direct transmission mode is displayed on the LCD monitor 141. Thereby, the direct transmission
15 of the pickup image becomes easy for a user to recognize.

The manipulation at this time is recognized by the main CPU 161 in the main control unit 160 via the controller 131 in the peripheral unit 130, so that the
20 composite device 100 operates in the direct transmission mode.

Besides, a user selects the destination server from the screen (hereinafter, referred to as "transmission destination selecting screen") displayed
25 in the LCD monitor 141 as shown in Fig. 3. The screen display at this time is performed under control of the LCD controller 143.

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Specifically, by manipulating a given manipulating switch in the switch group 132 or the like, a user registers the locations and phone numbers of destination servers (here, designated with server A, server B, server C, server D, ...) in advance. This registration information item is stored in the database configured within the flash memory 162 of the main control unit 160 via the controller 131 in the peripheral unit 130. Thus, it is allowed that a registered information item stored in this database is read out and displayed on the LCD monitor 141 as the transmission destination selecting screen.

As shown in Fig. 3, the transmission destination selecting screen comprises a field 301 in which to display the name of a server, a field 302 in which to display the location of a server, a field 303 in which to display the phone number of a server with a user name and a password (not displayed) and moreover a manipulating key unit 305 including a "SELECT" key, an "OK" key and a "CANCEL" key and a curser 304.

On such a transmission destination selecting screen, a user uses various keys of the manipulation key unit 305 and a curser 304 to select and decide the destination server. Fig. 3 shows a condition that the "server A" is selected. Such a manipulation is recognized by the main CPU 161 in the main control unit 160 via the LCD controller 143 in the LCD unit 140.

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the CCD 112 in the image pickup unit 110 is taken into the image processing unit 120 (step S203).

In the image processing unit 120, the image processing CPU 121 stores the pickup image signal from the image pickup unit 110 once into the buffer memory 122 and various correction processing is made about brightness, white balance and the like in the image signal. Thereafter, in the main control unit 160, the main CPU 161 makes a format conversion of the pickup image signal subjected to various correction in the image processing unit 120 into the JPEG form or the like and the resultant pickup image data is stored into the flash memory 160 (steps S204 and S205).

Then, in the main control unit 160, the main CPU 161 discriminates to which mode the composite device 100 is set at present (step S206).

If the composite device 100 is found to be set to the direct transmission mode as a result of this discrimination, the following processing from the step S208 is executed.

On the other hand, if the composite device 100 is set to another mode than the direct transmission mode, i.e. to the normal transmission mode, the main CPU 161 makes an operating control of the overall composite device 100 so as to operate according to the flow chart shown in Fig. 16 (step S207).

If the composite device 100 is set to the direct

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In case of transmission "OK" as a result of this step S208, the processing from the subsequent step 210 is executed. On the other hand, in case of transmission "NG", the main CPU 161 displays a message indicating that purport (communication impossibility) or the like on the color LCD monitor 143 in the LCD unit 140 (step S209).

15 If the radio wave state is transmission OK, call generation and call reception to a public network are performed in the composite device 100 as with the steps S537 to S539 shown in Fig. 16 (step S210).

Incidentally, since the flow between this call generation and the public network connection and the process of negotiation with the destination server after the call reception differ in communication method, or use protocol, here, it is simply discriminated whether the destination server responds to the call reception or not. And, if the destination server does not respond to the call reception for a reason that the communication port of the server is in

use or so, a message of being busy is returned to the composite device 100. In this case, the main CPU 161 makes an operating control for notifying a message or the like indicating the purport (communication impossibility) to a user by using the display on the color LCD monitor 143 of the LCD unit 140, an alarm sound or the like (step S211). Thus, only if the call reception and negotiation proceeds normally and the communication between the composite device 100 and the transmission destination server is established, the processing steps from the next step S212 are executed.

When the communication between the composite device 100 and the destination server is established by the call generation and call reception at the step S210, the main CPU 161 in the main control unit 160 transfers the pickup image data within the flash memory 162 once to the buffer memory 163 (step S212).

And, the main CPU 161 decomposes the pickup image data within the buffer memory 163 (assumed to be image data of JPEG type) into packets according to a protocol such as TCP/IP and supplies those packet data to the communication unit 150 (step S213).

In the communication unit 150, the communication controller 151 converts the packet data from the main control unit 160 in accordance with the procedure determined corresponding to the type of a composite device 100 (here, assumed to be a transmission control

procedure such as "PIAFS") and stores the packet data after this conversion into the communication buffer memory 152 (step S214).

5 After converted into a frequency band adapted to the device by means of the RF module 155, the packet data within the communication buffer memory 152 are transmitted to the base station via the antenna 156 and transmitted to the destination server through a public network (step S215).

10 In the server that received this, the pickup image is restored through the procedure reverse to the above in the composite device 100.

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15 After the transmission of the packet data (pickup image data) within the communication buffer memory 152 ends, the main CPU 161 on the main control unit 160, having recognized this end, issues a request for disconnection to the communication controller 819 in the communication unit 150. Thereby, as with the above processing at the call generation, the communication
20 controller 819 makes a communication end processing in accordance with the specified procedure (step S216).

25 As mentioned above, in this embodiment, since the direct transmission mode is so configured as to be set up in which a communication with the remote place server via a public network is automatically made at once after the shutter switch 512 depressed and pickup images are automatically transmitted if the

communication with the server is executable, a user can transmit the pickup image obtained by photographing to a desired server at once only by a simple manipulation of changing the mode of the composite device 100 into the direct transmission mode. Thus, every time of pickup image transmission, a user need not repeat the selection of a transmission image, the mode change to direct transmission mode, the selection of a destination server or like operations unlike former devices.

Incidentally, if the above composite device 100 is applied to the relay use or the like, i.e. if no pickup image always needs to be stored in the composite device itself 100, the process of write in the flash memory 162 and read from the flash memory 162 to the buffer memory 163 at the steps S205 and S212 in Fig. 2 is unnecessary.

In such cases, for example, assuming that the buffer memory 163 is configured by a speedier buffer memory and images after the image pickup is so configured as to be transmitted to a server directly through the communication unit 150, the memory region for image storage in the composite device 100 can be effectively used without waste.

(Second Embodiment)

In addition to the configuration of the first embodiment, this embodiment is so configured that in

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Here, since the first depression time of the shutter switch 512 is discussed, the discrimination flag is "OFF." Thus, in the above-mentioned manner, the call generation and call reception processing according to the steps of S208 to S210 is carried out and the transmission of a pickup image to the server is executed if communication with the destination server is possible (step S215).

Namely, in the main control unit 160, first, the main CPU 161 sets the timer for a predetermined period of time inside of it (step S270) and keeps waiting while monitoring the occurrence of an interruption by a depression of the shutter switch 512 at the step S202 (step S271).

On the other hand, if a value of time does not reach 0, the main CPU 161 discriminates whether an interruption due to a depression of the shutter switch 512 has occurred (step S274). If an interruption occurs as a result of this discrimination, the main CPU

5 Accordingly, when the shutter switch 512 is depressed at a second time within a predetermined time set up on the timer inside the main CPU 161 from the first depression of the shutter switch 512, the processing from the above-mentioned step S201 is carried out in the "ON" state of the discrimination flag and the discrimination of the step S250 cancels the call generation and call reception at the steps of S208 to S210, so that the transmission processing of a pickup image from the step 212 is executed as it stands.

Besides, when the shutter switch 512 is depressed at the next time after the lapse of a predetermined time set up on the timer inside the main CPU 161 from the first depression of the shutter switch 512, the processing from the above-mentioned step S201 is carried out in the "OFF" state of the discrimination flag and the discrimination of the step S250 permits the call generation and call reception at the steps of S208 to S210 to be executed as done during the first depression of the shutter switch 512, so that the transmission processing of a pickup image from the step 212 is executed.

5 Setting of a timer in the main CPU 161 for this
purpose is considered in various ways depending on uses
or circumstances, but its matching to the unit charging
time of a network connection fee can suppress the
occurrence of a wasteful fee, for example, from the
viewpoint of economics.

In Figs. 6A, 6B and 6C, the first setting screen 311 is so configured that any one of economy priority mode (ECONOMY), business emphasis mode (BUSINESS) and user manual setting mode (USER SETTING) is selectable corresponding to the uses of a user. Here, the screen state is shown in which a user selects the economy priority mode (ECONOMY).

The next setting screen 312 is a screen at the time of selecting the economy priority mode (ECONOMY) and is so configured that a user can confirm the list of the minimum charging second in communication fee depending on the time and district and can instruct

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(Third Embodiment)

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implementing this makes it unnecessary that a user waits for the recovery of the radio wave state, prevents the impossibility of photographing before the completion of transmission and makes unnecessary the movement to a place where the radio wave state is good for the transmission, so that photographing becomes possible even before the radio wave state is recovered. In other words, a user becomes free of the photographic obstruction due to a bad radio wave state and can take a photograph smoothly.

Hereinafter, one example of configuration of this embodiment will be specifically described.

First, with respect to a hardware configuration, this is fundamentally the same configuration as that shown in Figs. 1A and 1B, but the capacity of a buffer memory 163 in the main control unit 160 is made greater than that of a configuration according to the first embodiment. This is because the buffer memory 163 is further used as an image data buffer for storing untransmitted images in this embodiment whereas it is chiefly used as a work area attendant on the main CPU 161 in the first embodiment.

Here, the reason of using a buffer memory 163 rather than a flash memory 162 as the memory for storing the untransmitted image once is that a speedier access is possible for the buffer memory 163 than for the flash memory 162 and the time taken till the

release of a device (restoration to the photographing state) can be shortened by this speed. Besides, the buffer memory 163 is not necessarily used only for the image transmission but also as a simple image buffer, and accordingly becomes effective as a so-called snapshot buffer.

Incidentally, the description of the reason for the use of the above buffer memory 163 means that to use the buffer memory 163 is better than to use the flash memory 162 and as a matter of fact, does not deny the use of the flash memory 162. Namely, if the flash memory 162 low in unit capacity price is employed as the memory for storing untransmitted images once, more time is required for the storing an untransmitted image into the flash memory 162 but a merit of being capable of storing more imaged cannot be disregarded.

Besides, here, a buffer memory 163 or a flash memory 162 is used as the memory for storing untransmitted images once, but the present invention is not limited to this. For example, a dedicated memory for storing untransmitted images once may be provided.

Such being the case, a buffer memory 163 here is made up of different areas as shown in the memory map of Fig. 7.

To be specific, the buffer memory 163 is broadly divided into a work area 410 and a data area 420 as shown in Fig. 7.

The work area 410 is a memory area used the packing, unpacking or the like of images as described in the first embodiment and its fundamental uses are similar also in this embodiment.

5 The data area 420 is a memory area added in this embodiment for continuously and speedily storing the photographed images (photographic image) converted into a given format in the work area 410 within the capacity of the relevant memory.

10 The data area 420 is further divided into a memory area 421 for storing a file administrating table (FAT) and the like and a memory area 422 for storing image data and the like.

15 In the memory area 421, as shown in Fig. 8, for example, information items of various image files (photographic images) gather. In addition to the information content comprising serial numbers 431, final updated dates 432, start addresses 433 and end addresses 434, photographic data 435 such as
20 photographic resolution, shutter speed and diaphragm are stored as those peculiar to an image pickup device.

 In particular, it is characteristic here that one transmission WAITING flag 435a is added to each of photographic images in the zone of photographic data
25 435.

 This transmission WAITING flag 435a is added in the direct transmission mode but ignored in the other

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And, using functions mentioned later pertaining to a composite device 100, the presence of transmission WAITING images (untransmitted images) is notified to a user (step S444) and immediately this transmission

As examples of functions pertaining to a composite device 100 which were mentioned at the above step S444, a function to display how many untransmitted images remain on a color LC 143 by using icon(s), a function to blink the provided LED while untransmitted images remain or the like are considered.

According to this function, on the color LC 143,
as shown in Fig. 10, two icons indicating that two
untransmitted images remain are displayed at the upper
zone 452 of the area 451. These icons change in the
state of untransmitted images, and the number of icons
increases as untransmitted images increase. And if the
relevant untransmitted image is been transmitted, the
state of each untransmitted image is notified to a user
by changes such as blinking or the like.

As mentioned above, here, since it is configured in case of a bad radio wave state and transmitting impossibility or instability that untransmitted images are stored once in the buffer memory 163 and the transmission state returns to the photographic state before the completion of the transmission processing for untransmitted images, a user can keep taking a

untransmitted image, the main CPU 161 sets the transmission WAITING flag 435a corresponding to the relevant image to "OFF" by the processing of the step S464.

5 Besides, simultaneous to this, the main CPU 161 executes the processing of eliminating one of the icons indicating the presence of untransmitted images on the color LC 143 as shown in Fig. 10 from the relevant screen (step S465).

10 After the processing of the step S465, the processing from the step S462 is again executed. Namely, the processing at the steps of S462 to S465 are repeated and executed till all transmission WAITING flags 435a provided for individual pickup images stored
15 in the buffer memory 163 becomes "OFF."

 Accordingly, the above processing configuration enables a user to continue photographing regardless of any radio wave state. Thus, according to the third embodiment, the effect that the convenience can be
20 enhanced is obtained in addition to that of the first embodiment.

 Incidentally, in the above description, a composite device in which image pickup means and communicative means are integrated is used, but the
25 present invention may be so configured as to connect a communication device to an image pickup device through a cable or the like. In this case, if no communication

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device is necessary, for example, it is only necessary to carry image pickup means alone and therefore the necessities to be carried are light in weight.

Needless to say, the purpose of the present invention is attained also by supplying a storage medium to the system or device in which the program codes of the software for implementing the function of the host and terminal in the individual embodiments mentioned above are stored and allowing the computer (or CPU or MPU) of the system or device to read and execute the program codes stored in the storage medium.

In this case, the program codes themselves read from the storage medium implements the function of each embodiment and the storage medium in which the program codes are stored constitutes the present invention.

As storage media for supplying a program code, ROM, a floppy disk, a hard disk, an optical disk, a photomagnetic disk, a CD-ROM, a CD-R, a magnetic tape, a nonvolatile memory card and the like can be used.

Besides, needless to say, not only the function of each embodiment is implemented by executing the program codes read out by a computer but also a case where an OS or the like operating on the computer performs a part or the whole of an actual processing based on the instruction of the program codes and the function of each embodiment is implemented by the relevant processing is also included.

Furthermore, needless to say, a case where a program code read out from a storage medium are written into an extended function board inserted in a computer or a memory provided on an extended function unit
5 connected to a computer, then based on the instruction of the program code, a CPU or the like provided on the extended function board or the extended function unit performs a part or the whole of an actual processing and the function of each embodiment is implemented by
10 the relevant processing is also included.

In the present invention, as described above, an image pickup operation and a communication with a specified transmission destination (such as radio transmission) is started on the basis of the
15 instruction of a predetermined operation given from a user. Thereby, the pickup images obtained by the image pickup operation are automatically transmitted.

Besides, at this time, after the lapse of a predetermined time (a definite interval) from the end
20 of transmission to a specified transmission destination, a break of communication with the transmission destination (release of connection to the communication network) is made.

Specifically, when a predetermined operation with
25 a manipulating switch is performed by a user, for example, the operating mode of this device is switched to a predetermined mode. On depressing a shutter

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5 According to such a configuration, in case of
transmitting another pickup image directly after the
end of transmission of a certain pickup image, the
preprocessing (recall generation to a public network
and negotiation, processing of connection to a
0 destination server and the like) required at the time
of the ordinary connection can be automatically skipped
because the connection to the public network is not
broken within the above interval time.

20 Furthermore, the selection of an interval permits
either the economics priority or the instantaneous
response priority to be selected.

Besides, if the communication state (radio wave state for wireless transmission) is unsuitable to the communication in transmitting pickup images to a destination server (when an instruction of transmission was made), a configuration of once storing the pickup

images (untransmitted images) into a memory enables a user to continue a smooth photographing without need of waiting till the radio wave state is recovered and without need of moving to a place of a good radio wave state even for a bad radio wave state. Furthermore, if it is configured that the pickup images stored once in a memory are automatically transmitted when the radio wave state is restored to a state suitable for the communication, the convenience is enhanced.

10 Thus, to continue photographing regardless of any
radio wave state becomes possible and the convenience
can be further enhanced.